MAR 2 4 2000

# United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
500 NE Multnomah Street, Suite 356
Portland, Oregon 97232-2036

IN REPLY REFER TO:

March 17, 2000

ER 00/0076

U.S. Army Corps of Engineers
Lieutenant Colonel William E. Bulen, Jr.
District Engineer, Walla Walla District
ATTN: Lower Snake River Study
201 North Third Avenue
Walla Walla, Washington 99362-1876

Dear Colonel Bulen:

We (the Department of the Interior) have reviewed the Lower Snake River Juvenile Salmon Migration Feasibility Report/Draft Environmental Impact Statement (FR/EIS). Our comments center on the underlying scientific analyses that drive the alternatives and the decision-making. The U.S. Fish and Wildlife Service (Service) has also substantially commented on this proposed project in a Draft Fish and Wildlife Coordination Act Report (DCAR) which was sent to your office in December 1999. The DCAR is included in the FR/EIS as Appendix M.

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**General Comments:**

Threatened and Endangered Species

Description of Affected Listed Species:

There is no section in the main report which discusses all the threatened and endangered species found in the vicinity of the project. Section 4.6-3, Species with Federal Status, only addresses terrestrial wildlife and plant species and could mislead some to think other species are not likely to be affected. Although listed fish species are covered in the main report, the discussion on their Endangered Species Act (ESA) status is scattered throughout. We recommend that discussion of federally listed species appear in one section.

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The Goal is Recovery, Not Prevention of Extinction:

The goal of the ESA is recovery, not protection of a minimal stock-size indefinitely into the future. The Cumulative Risk Initiative (CRI) analyses described in the Appendix A, Anadromous Fish (A-Fish) fails to adequately evaluate options for recovery. The document should be explicit

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throughout that these assessments are oriented toward minimizing short-term extinction and not for eventual recovery; and it should explain the difference between the two. There are many instances in the A-Fish where management actions are discussed loosely as producing "adequate increases in annual population growth" that do not refer to recovery. When an action is likely to help avoid short-term extinction but unlikely to lead to recovery, it should be clearly noted.

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The emphasis on the short-term prevention of extinction and the lack of modeling and consideration of recovery is a serious weakness of the National Marine Fisheries Service (NMFS) CRI and the A-Fish as a whole. We recommend that the NMFS and the U.S. Army Corps of Engineers (Corps) ensure their scientific analyses not focus solely on management actions that avoid short-term extinction versus efforts that both prevent short-term extinction and at the same time provide for recovery relative to the subject action. Management actions that only alleviate short term extinction (e.g. decreasing harvest) delay the start of long-term management actions (e.g. drawdown or habitat restoration) that are likely to lead to full stock recovery (e.g. drawdown) but may take a long time to implement. Delays in implementing management actions could impair or prevent full recovery of some stocks and may contribute to their extinction.

NMFS Should Update the Anadromous Fish Appendix

Modeling results presented in the A-Fish do not reflect the most recent changes to CRI analyses. NMFS should use the most recent analyses and document changes made in response to past criticisms. NMFS recently (March 8, 2000) released new draft modeling results, with updated information, on extinction risk at different quasi extinction levels and the probability of decline to a threshold level. The A-Fish should be updated to include these results. NMFS has changed and updated their analyses repeatedly since the time the A-Fish was written. We request that the FR/EIS document which version of keyed analyses they consider to be the most current, what changes have been made, how they affect analyses and conclusions, and the status of concerns raised by the Department of the Interior, key technical staff from other Federal and State agencies, and the Independent Scientific Advisory Board.

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Critique of the CRI:

The Service has provided earlier comments on the validity of the NMFS CRI analyses and the A-Fish. Concerns have been raised at workshops, in comments on workshop presentations, and in reviews of previous drafts of this report, and the All-H paper. Other technical concerns will be discussed in greater detail in an upcoming multi-agency technical paper. In particular, we are concerned about heavy reliance on models developed solely by NMFS without multi-agency participation, the validity of mortality data and application of this data across the salmon life cycle, and the treatment of extra mortality and delayed mortality, and the application of extinction risk across populations (as discussed in the A-Fish). Detailed discussion follows:

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- Recent NMFS CRI Changes: As noted in our comments on earlier drafts of this FR/EIS, we remain concerned about the heavy reliance on modeling results produced solely by

9 cont. NMFS in its CRI analysis instead of an open, multi-agency forum such as the Process for Analyzing and Testing Hypothesis (PATH). It is likely that the problems described below concerning the addition of some infeasible management actions and the misapplication of data would not have occurred if the CRI analysis were developed in a multi-agency forum with other expert biologists, as was done with PATH.

- Distribution of Mortality and Model Validation: We are concerned about the lack of validation or corroboration of the model to existing data and the way NMFS has distributed mortality data in the NMFS Leslie matrices. In PATH, all known sources of mortality (direct from the hydrosystem, harvest etc.) were estimated, and then the remaining unexplained mortality in the estuary and ocean was solved for last, and termed extra mortality. Using this approach, PATH solved last for the variable or life stage for which there was the least amount of information and based the model structure on the life stages for which there was the best data. In contrast, in the CRI Leslie matrix for spring and summer chinook, egg-to-smolt survival (S1) is solved for after other sources of mortality have been estimated and estuary and early ocean survival are based on a best guess from a range of coho and pink ocean survivals. We believe the method used in PATH is more logical and robust, and recommend that parameters used in the NMFS CRI model be corroborated with data where available. We also have several concerns about the approach used by CRI for spring and summer chinook:

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1) When we compare the resulting CRI estimates of S1 to independent estimates from data, it appears that CRI is underestimating survival in this life stage.

2) It appears that the 7 percent used in the CRI Leslie matrix for estuary and early ocean survival is based on data for a different species for a different life stage.

3) When we compare the smolt-to-adult (SAR) survival rates that result from the CRI Leslie matrix to our best data estimates of SAR, it appears that NMFS is overestimating survival in this life stage.

These potential problems with the distribution of mortality in the CRI matrix will affect model results that seek to identify life stages where management would have the greatest effect. When mortality is overestimated in one life stage, it will be underestimated in another life stage.

- Sensitivity Analyses and Feasibility: We do not support the method that NMFS is using to assess the potential survival benefits of different management scenarios.

11 The NMFS CRI approach to modeling the reduction of hatchery steelhead provides an example. NMFS models a 22 percent (or possibly 17 percent now) reduction in mortality of fry based on the"hypothetical" removal of hatchery steelhead from freshwater rearing areas. However, data from the Idaho Department of Fish and Game (letter to the Service,

11 cont.

November 23, 1999) show that most hatchery steelhead sampled had empty stomachs, and hatchery steelhead are found only in one of the seven index streams. The Service supplied this information to NMFS in November 1999. Note that the hatchery steelhead scenario is just one example. We have similar concerns about the way NMFS has evaluated habitat improvements and improvements in other H's. Clearly, this hypothetical approach explains little about the true survival improvement we can expect from that management action and has the danger of directing decisions about management in the All H's towards actions that may have no real benefit.

Analysis of Extra Mortality and Differential Delayed Mortality of Transported Fish (D) in A-Fish:

We believe the manner in which the extra mortality is modeled, evaluated, and discussed in the A-Fish is inadequate. We recommend that the D and the extra mortality of in-river migrants be included and explicitly modeled in CRI analyses. If both are modeled, an evaluation of the relative benefits of maximizing transportation versus drawdown becomes possible. Without it, the model provides an underestimation of the potential benefits of drawdown overall. Given that D and extra mortality are key uncertainties, NMFS should incorporate both into modeling and results, not treat them as hypothetical complications.

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We recommend using a decision analysis approach like that used in PATH or a formal weight of evidence for hydrosystem based extra mortality and differential delayed transport mortality. In a formal weight of evidence, all of the evidence for and against each of the various hypotheses about delayed and extra mortality would be assembled and presented to an independent scientific review panel. This panel would then weight the evidence for and against, and the weights could be used in modeling and/or for evaluating model results.

We disagree with the NMFS claim that no data exist that attribute delayed mortality to past experience. The evidence that links extra mortality to hydrosystem experience should be discussed here and considered in a formal weight of evidence. Evidence for extra mortality comes in at least the following three forms:

1) Indirect evidence from retrospective analyses of stock and recruitment data and comparisons of these data for stocks of concern to other stocks with similar characteristics but different hydrosystem experiences.

2) Direct evidence of extra mortality, and the relationship between hydrosystem experience and this extra mortality, from recent NMFS PIT tag data documenting individual hydrosystem passage and survival histories.

3) Scientific literature not only on the delayed effects of stress for salmon, but also for many other organisms.

Regarding D, the text should reflect that the dispute over D is still ongoing and that there are

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conflicting view points on how to calculate D, what the average value of D is for recent years, and whether or not it is conclusively "measurable". Bouwes et al. 1999 analyzed a suite of plausible assumptions used in the calculation of D for Snake River spring/summer chinook salmon. Based on this analysis of the 1994-1996 PIT-tag data, there is a wide range of possible D-values. Given these uncertainties and year-to-year variation in D estimates, we recommend using a range of D values for spring/summer chinook from the different methods (0.49-0.83). The amount of variation in D values (not just the average value) has significant implications on evaluating recovery strategies for Snake River chinook populations.

Extinction Risk Discussion in A-Fish:

We are concerned with the way extinction risk is being evaluated for steelhead and fall chinook compared to extinction risk calculations for spring and summer chinook. For spring and summer chinook, extinction risk is presented for each index stock independently. Fall chinook however are presented as an entire evolutionarily significant unit (ESU). This risk of extinction for each stock from a larger stock group or ESU is not directly comparable to the risk of extinction estimated for an entire ESU. Similarly, since the data do not allow extinction analyses for each of the steelhead stocks, NMFS has estimated the risk of extinction for the steelhead ESU instead.

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This error is reflected in calculations of quasi-extinction thresholds. NMFS uses the same quasi-extinction threshold for each of the spring and summer chinook stocks as they do for the aggregate of the steelhead stocks and for the fall chinook ESU. If the quasi-extinction threshold is 1 fish for each stock, then it should be 40 fish for the 40 stocks of steelhead (and even that would be optimistic given dispensation, etc.). Losing one stock of spring and summer chinook is not equivalent or comparable to losing the entire fall chinook ESU. Quasi-extinction thresholds should reflect the different level of aggregation being considered, and results should be discussed in light of these differences.

Integrating the A-Fish Discussion Across Stocks and ESUs:

Similar to our concern about application of extinction risk, we believe the CRI fails to integrate across populations, in particular stocks and ESUs. We recommend that the A-Fish integrate valid CRI results across stocks and ESU's. We find two problems in this general category: 1) CRI modeling efforts do not adequately capture the range of biological benefits from certain management actions across stocks (a sort of feasibility issue), and 2) the results need to be synthesized and presented in a manner that integrates management actions that have the greatest benefit across stocks and ESUs.

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Continuing the steelhead example, some streams have hatchery steelhead and some do not. Similarly, some stocks spawn and rear in pristine wilderness and others in streams of degraded habitat. The CRI analyses, however, model survival improvements from habitat or hatchery steelhead removal equally across all stocks and streams, disregarding that the benefit from a certain management action will vary widely depending on the characteristics of each stock and

stream. Applying a 10 percent improvement in survival based on habitat improvements to all spring and summer chinook stocks is misleading and overestimates the possible benefits from habitat improvements.

15 cont. The results of the CRI should be presented in a table or graphic that shows the benefit from improvements in each H for each ESU. This will allow the public and decision makers to assess the relative benefit of different management actions (or combinations of actions) across all the Snake River ESUs. The A-Fish describes where improvements have the greatest benefit separately for each ESU, which can be confusing and difficult to synthesize, since we are most interested in the management action (or actions) that will give the greatest benefit for all the stocks and ESUs.

Flow Augmentation

16 It is not clearly identified in the FR/EIS whether Alternative 4, Dam Breaching, has been evaluated both with and without flow augmentation (page 3-13, line 6). We believe that Alternative 4 must be analyzed both with and without flow augmentation for their effects on physical conditions and biological responses. Results of these analyses should be included in the main report of the FR/EIS. Physical conditions which should be analyzed include changes in water temperature, water velocity, and turbidity. We recommend the Environmental Protection Agency's (EPA) temperature model be used for this analysis. Biological effects to be considered should include at least juvenile salmonid migration and survival, spawning time, egg incubation, emergence timing, and adult migration.

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Context

18, 19 To ensure balance, the FR/EIS should include a discussion of how the human effects that are identified compare to the regional and national economy. For example, work done by CH2MHill for the Multi-Species Framework Human Effects Workgroup entitled *Summary of Human Effects of Multi-Species Framework Process Alternatives* (April 1999) estimates the total gross value of production in the four-state region at $300 billion per year. The study also estimates that costs that are similar to those estimated by the Corps in Appendix I represent about 0.1 to 0.2 percent of the gross value of regional production. It would also be informative to compare the effects of the alternatives to Federal actions regarding the spotted owl and other significant natural resource decisions. Putting the results in context will provide significant benefits to decision-makers and the public.

Regional Analysis

20 We recommend the economic analysis in Appendix I include the potential benefits to other communities such as Astoria, Oregon and Ilwaco, Washington from an expanded recreational and commercial fishery. Although, on page 4.1-4 of the main report, it is stated that incomes from salmon harvest continue to be strong elements of some local economies in Oregon and Washington and treaty tribes.

Clean Water Act Compliance

21, 22 Recent staff analysis from the Service, EPA, and NMFS estimated the costs of meeting the dissolved gas standards at the lower Snake River dams. Side channel spillways were estimated to cost $410 million per dam. Four dams would cost approximately $1.6 billion. The staff estimates also included other gas abatement actions over and above those included in the current Corps' analysis. These other measures totaled approximately $60 million. Some of these other measures may be included in the Appendix I, but it is difficult to determine. The annual repayment costs for these measures would be approximately $170 million per year. We recommend the FR/EIS include discussions of these costs.

Compensation for Treaty Rights

23, 24 We recommend that the issue of compensation to tribes for loss of treaty rights be discussed further. If management actions do not achieve recovery and delisting, there is a risk that Columbia Basin Indian tribes would seek claims under their Treaties and Executive Orders with the United States. We cannot estimate what those claims might be, but note that Appendix I estimates the value of the tribal fishery, pre-development, at approximately $252 million per year. If tribes sought damages for losses since the Treaties were signed in 1855, the potential costs could be substantial.

**Specific Comments:**

25 Page 2-10, Section 2.1.1.5, Spill for Juvenile Passage: We recommend that this section, which highlights the potential gas supersaturation problem associated with voluntary spill also discuss the more severe problem that occurs with involuntary spill. Dissolved gas levels during periods of involuntary spill can be much higher than the Oregon and Washington waiver levels of 115 percent (forebay) and 120 percent (tailrace).

26 Page 2-14, Section 2.1.8, Lower Snake River Fish and Wildlife Compensation Plan: The second paragraph lists activities that would lead a reader to conclude they are part of the Comp Plan; however, some activities are not a part of the Comp Plan. The sockeye salmon captive broodstock program and the coho salmon program in Clearwater Basin are funded by BPA as part of their Fish and Wildlife Program. Since, they are not part of the Comp Plan they should not be included in Section 2.1.8.

27 Page 2-19, Table 2-4: We recommend adding the megawatts (MW) of energy from each dam in addition to the capacity. Given the operating characteristics of these dams in the Northwest power system, the energy statistic is probably more important.

28 Page 3-7, lines 1-5: This section should also briefly describe the fish that are produced at Lyons Ferry Hatchery and that are released into the lower Snake River.

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Page 4.4-5, Section 4.4.2, Water Quality: The scope of the Corps' 1997 Lower Snake River Sediment Quality Study should address the complexity of contaminant bioavailability to aquatic species. For example, detection limits used were not always below the level of concern for known adverse effects to aquatic organisms. We recommend that detection limits be lowered. Furthermore, sediment core samples were only taken to a maximum depth of six feet, although sediments are much deeper than that in many locations. We recommend that deeper cores be taken. Bulk-sediment analysis and elutriate testing of sediments was used to analyze sediments. Bioavailability of sediment-bound contaminants is a chronic exposure problem that cannot be determined by these two testing methods. Bulk-sediment analysis does not take into account the potential changes in toxicity of compounds influenced by changes in the environment from drawdown or physiological changes within organisms. In addition, elutriate testing of sediments does not analyze the concentrations of non-water soluble compounds bound to the sediment. Recommendations were provided in Section 12.5 of Appendix M, Fish and Wildlife Coordination Act Report, for additional testing and analyses which could be done to gain a better understanding of the potential impacts of contaminants on aquatic organisms.

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Page 4.4-9, Section 4.4.2.3, Water Quality Standards: It should be noted that all three states are currently under their Triennial Review for Water Quality Standards. Therefore, state standards will change in the near future and the FR/EIS should reflect any relevant changes made. Also, this section should include any "sediment criteria" for aquatic resources that any of the three states may have.

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Page 4.4-18, Section 4.4.2.4, Other Contaminants: This section states that peak levels of certain metals including copper and zinc, pesticide residues, and dioxins have been noted as potential concerns throughout the lower Snake River. However, in Sections 5.3.2, Water Quality and 5.4.1.4, Alternative 4-Dam Breaching, copper, zinc, and pesticide residues are not addressed. These metals and pesticides should be addressed and discussed further in these sections, since they may have environmental effects should drawdown occur. For example, acceptable limits for the other contaminants should be described. While glyphosate concentrations in the lower Snake River are given, it is not stated whether these levels are of concern.

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Page 4.5-35, line 40: Delete "A few individuals of the species" and replace with "As many as 14 bull trout." The citation for this information is S. Richards, WDFW, unpublished data. We recommend adding a statement indicating that migratory bull trout from the Tucannon River also utilize the lower Snake River on a seasonal basis (Buchanan et al. 1997, citing Ward; WDFW, 1997). This helps give a more complete picture of bull trout use of the lower Snake River before the dams. The references are listed in the Literature Cited section of Appendix M.

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Page 4.5-35, lines 26-27: The FR/EIS stated that predation levels have been "reduced substantially in recent years as the result of high harvest levels supported by the Sport Reward Program." We believe this is an overstatement and should simply read "reduced in recent years." Naughton (1998) found little predation by northern pikeminnow on salmonids and suggested reduced population numbers could *partially* be attributed to the Sport Reward Program. Appendix B, Resident Fish, states their population numbers have been substantially reduced due

35, 36, 37 cont. to the Sport Reward Program and scientific sampling. Also, several researchers have concluded predation is not a major source of mortality to most salmonids in the Snake River (see Section 5.2.3 of Appendix M). The exception is fall chinook subyearlings, which are particularly susceptible.

38 Figures 4.6-2 and 4.6-3: Both should both be adjusted to reflect the addition of forbland to the riparian habitat type, as described in the following bullets.

39 Page 4.6-4, line 17: The riparian acreage total should include the 1,916 acres of forest land present along the projects and would then total 5,200 acres. It should be noted that while the majority of the forest land is riparian, there are some areas of forest land which would not be classified as riparian. Unfortunately, the cover typing does not allow the upland segments to be analyzed separately.

40 Page 4.6-4, line 26: The current acreage of riparian habitat listed (1,804 acres) should be increased by the current acreage of forest land (769 acres) to total 2,573 acres.

41 Page 4.6-6, line 24: 18,149 acres are identified as upland but that figure includes 769 acres of forestland. The figure should be reduced to 17,380 acres.

42, 43 Page 4.6-15, line 3: Uncompensated losses for quail is given as 18,861 Habitat Units (HUs), but is listed as 20,985.8 in Table 3, Appendix L, Lower Snake River Mitigation History and Status. This discrepancy should be reconciled.

44, 45 Page 4.6-15, line 6: The uncompensated losses for pheasant and chukar do not match those listed in Appendix L. Please ensure that all HU figures in the main report and Appendix L are reconciled.

46 Page 4.6-23, line 36: Change the number of plant species to six and add Spalding's silene.

47 Page 4.6-23, lines 37 and 39: Insert a hyphen between "ladies'" and "tresses."

48 Page 4.6-23, line 39: After the word "thelypodium" add "and Spalding's silene."

49 Page 4.6-25, line 7: After this section add a short description of Spalding's silene as was done for other species.

50, 51 Page 4.13-1, first paragraph: Hunting is a recreation activity that should also be mentioned here. It can be both water-based (waterfowl hunting) and land-based (upland game bird and deer hunting). Additionally, other non-consumptive recreation activities such as birdwatching, wildlife viewing, sight-seeing, etc. should also be mentioned.

52 Page 4.13-4, Table 4.13-2: The percentage of hunting visitors appeared much lower than we would have expected. Please comment on potential explanations. For example, were surveys

52 | disproportionately completed outside of the hunting seasons?

53 | Page 5-1, Table 5.1-1, and p. 5-2, Section 5.1-3, Alternative 4: Dam Breaching--Simply stating that roadway and railroad embankments could fail gives an incomplete picture. The Corps already has plans to protect these areas with riprap to prevent their failure and to quickly repair those which still fail. We suggest adding the wording "however mitigation measures have been determined" after the wording "embankments could fail." A short discussion on planned mitigation measures should be added to Section 5.1.3.

54 | Page 5.2-3, Replacement of Power Generation: We understand that the Corps and BPA are working with several public interest groups to identify energy efficiency and renewable resources that could be used to replace the Snake River dams and maintain current emission levels of $CO^2$. This analysis will also include the costs of this strategy. It would be useful to address this issue in this section.

55 | Page 5.2-8, Table 5.2-5.: The FR/EIS should make clear what time frame was used to determine average annual fugitive dust emissions from exposed sediments. We believe that following drawdown, exposed sediments would be rapidly vegetated from both revegetation efforts and weed invasion. This is supported by the statement on page 5.14-3 that says "any dust or odor would only last one or two years following transmission."

56 | Page 5.2-8, last line: The FR/EIS writers make an assumption that mitigation efforts would reduce dust emissions by only 50 percent. A 50 percent reduction is significantly lower than what we anticipate would occur within one year of the drawdown. Note that the reduction should take into account mitigation efforts as well as the rapid weed growth that would concurrently take place. Also, there should be a discussion of how long fugutive dust related to the drawdown would be expected to occur. We believe fugitive dust from exposed sediments should be virtually nonexistent following the second growing season after drawdown.

57, 58, 59 | Page 5.3-8, Section 5.3.2.3, Contaminants: Our analysis of the Corps' sediment contaminant study detected concentrations of organochlorine and organophosophorus pesticides and heavy metals known to have toxicological effects to aquatic species. Furthermore, the detection limits for pesticides and metals of concern, such as mercury, DDT, Dieldrin, Endrin, and Chlorpyriphos, were not low enough in this study to detect concentrations of compounds at levels that are of concern to the health of aquatic organisms. Although the Corps' detection limits may have satisfied State water quality standards, the health of aquatic organisms could still be affected by a smaller concentration of a particular contaminant. We request that this section discuss the potential of some contaminant levels being high enough to effect the health of some aquatic species.

60 | Section 5.4, Aquatic Resources: This section does not appear to contain the economic analysis from Appendix I. We recommend that the FR/EIS incorporate the following information in the Environmental Effects of Alternatives section.

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While this section identifies established measures to be considered to meet survival and recovery goals of Snake River salmon species under the ESA, the Corps still has a responsibility to meet its authorized fish mitigation goals. The main report should contain an analysis that determines the effectiveness of the alternatives at meeting the Corps' mitigation responsibility. The USFWS assessment of the proposed alternatives' effectiveness is included in Section 11.1.1 of Appendix M and includes the following:

"It is unlikely that reaching Compensation Plan compensation goals will be achieved with the current hydrosystem in place. In all cases, very poor smolt to adult survival was the reason for a program's inability to meet its individual compensation goals. This poor survival is directly tied to the operation of the hydroelectric system on the lower Snake River."

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"The implementation of the Surface Bypass/Collection Alternative relies on conceptual and theoretical improvements of passage and survival around each of the facilities. While it is difficult to speculate on the effects of this alternative on Compensation Plan programs, it is unknown if it would significantly improve juvenile survival or allow realization of Compensation Plan adult goals in the near future."

"The best hope of reaching the original Compensation Plan compensation goals is the implementation of the Natural River Drawdown Alternative. The anticipated juvenile survival improvement would allow the Compensation Plan to meet its compensation goals and assist in recovery and restoration and may reduce or eliminate compensation needs."

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Page 5.4-11, line 5: The FR/EIS states that cool water releases from Dworshak Dam could be detrimental to Clearwater River juvenile fall chinook by extending the period before these fish are ready to migrate. Although this is true when water temperatures are low, the actual operations recommended by the Technical Management Team in recent years have recognized this situation and tried to keep temperatures at or near 50 degrees until Clearwater River fish have migrated.

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Page 5.4-34, line 13: This section states that about 25 percent of the future shoreline would be riprapped. We recommend that more environmentally appropriate materials such as root wads be used. Also, the reason for such extensive riprap placement should be documented and appropriate references made.

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Page 5.4-37, Rearing and Migratory Habitat, line 13: This sentence could lead the reader to believe that rearing fall chinook would be significantly impacted by short-term changes in turbidity and moving sediment. Although the next sentence indicates that most rearing occurs upstream of the reservoirs, additional clarification is needed. We recommend deleting the first two sentences in this section and replacing with the following two sentences: "The short-term effects of turbidity and moving sediment would likely be experienced most by rearing fall chinook salmon. However, the majority of the rearing period is spent upstream of the lower Snake River reservoirs."

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Page 5.4-37, line 35: After this sentence, add the following sentence: "The number of November

69 cont. migrants is relatively small compared to the total number of juvenile fall chinook and sockeye migrants."

70 Page 5.4-40, line 4: BRD, 1999, is cited as a reference in this sentence, but is not listed in the Literature Cited section. Updated fall chinook spawning habitat information from the work that the U.S. Geological Survey Biological Resources Division (BRD) did for the Service is included in Appendix M.

71 Page 5.4-47, lines 25 to 30: The discussion of potential fall chinook rearing habitat at the end of this section implies that dam breaching would not provide much benefit. Our analysis is that dam breaching would provide significant long-term benefits including facilitating recovery of the Snake River listed stocks. The rearing criteria established by BRD were overly restrictive (suitable rearing habitat was defined as areas where the probability of encountering ten or more fish at an electroshocking site was more than 50 percent). We consider the 160 miles of suitable shoreline habitat for rearing to be significant.

72 Page 5.4-47, lines 30,31: The statement equating 42 percent of shoreline area to only 5 percent of total wetland perimeter area is not clear and needs to be clarified.

73 Page 5.4-49, line 37: At the end of the paragraph, add a statement discussing that although the increase in spawning habitat resulting from dam breaching would likely be less than historic known spawning habitat lost upstream of Hells Canyon, it would provide a significant increase relative to the existing spawning habitat in the lower Snake River.

74 Page 5.5-4, line 41: Change "nearer to the mouth of the Snake River" to "nearer to the upstream limits of the study area."

75, 76 Page 5.5-6, lines 28 to 32: We recommend that the Corps reconcile this section with Appendix F. This section states that it is likely that the main river would be the deposition site for most resuspended sediments following drawdown; and if that occurs, there would not be a significant increase in potential wetland or riparian habitats. However, Appendix F, Hydrology/Hydraulics and Sedimentation, states that the left bank of the Columbia River from the confluence with the Snake River down to the confluence with the Walla Walla River appears most susceptible to sediment deposition. Furthermore, page 5.3-5, lines 19, 20 of the main report states that most of the sediment would deposit in coves near the shoreline. Therefore, and depending on various depositional factors, wetland and riparian development could be significant along several miles of Columbia River shoreline following drawdown.

77 Page 5.5-9, sentence beginning on line 10: This statement is incorrectly attributed to Appendix M, Fish and Wildlife Coordination Act Report.

78, 79 Section 5.7, Native American Indians: We recommend that this section put an economic value on the tribal fishery. We understand the reluctance of tribal leaders to characterize the importance of salmon in dollar terms; however, failure to identify some dollar value understates the economic

78, 79 cont. effects of restoring the tribal fishery. We hope Federal agencies can work with tribal leaders to find an acceptable way to address this issue.

80 Section 5.8, Transportation: We recommend that this section include a discussion of potential mitigation techniques to address the impacts that are identified.

81 Section 5.10, Agriculture, Municipal, and Industrial Water Uses: The analysis and discussion on effects of the drawdown on agricultural irrigation only generally addressed groundwater options to replace river pump stations or supplement the various pumping options. A cost analysis should be also presented. Additionally, the analysis and discussion on municipal, industrial, and other uses should include a discussion of the feasibility and cost of wells supplementing current pumping stations in Lower Granite Reservoir.

82, 83 Section 5.10.2.4, Alternative 4 - Dam Breaching, Privately Owned Wells: There are some discrepancies in this section that need to be addressed. On page 5.10-7, line 33, it is stated that there are 209 functioning wells within about one mile of the lower Snake River. However, on page D8-3, line 4, of Appendix D, the number of wells is listed as approximately 180. Also, on page 5.10-8, first line, it says that "about 40 % or 95" of the 209 wells would need to be modified. However, 40 % of 209 is only 84. Finally, the cost of modifying less than 100 wells is given as $56,447,000.00. This cost seems extremely high, and there should be some discussion on the analysis used to determine this cost. Please include the costs of recently constructed wells in the area for comparison.

84 Page 5.12-15, Table 5.12-3: Following this table, there is a discussion on projected recovery of fishing activity after breaching, along with other recreational activities. However, while the table includes summaries of these projections for the other activities, it omits fishing. This omission should be corrected

85 Section 5.12.4.3, Effects on Recreational Activities and Visitation: The FR/EIS should discuss effects to hunting from the drawdown in this section, although there is a reference to it in Table 5.12-3. We believe that hunting opportunities would be much improved in the future with the drawdown. There would be a significantly increased land base for hunting opportunities and the quality of the habitat would eventually be much improved over current conditions. For example, on page 5.12-13, last line, the main report states that the primary activities survey respondents participated in before Lower Granite Dam was constructed were sightseeing, fishing and hunting. The importance that hunting plays now and in the future should be included in the analysis in this section including the economic benefits. These economic calculations should be included in various appendices.

86 This section should discuss such activities as sightseeing, wildlife viewing, or birdwatching and potential effects following drawdown, although sightseeing was one of the three recreational activities participated in by respondents to a survey taken before Lower Granite Dam was constructed. The importance of these activities now and in the future should be included in this section, with the economic benefits they provide, and should appear in relevant economic

86 cont. calculations.

87 Page 5.13-21, Community Social Impacts: This section should discuss the social effects on lower river communities that could benefit from salmon and steelhead increases. For example, a description of the effects on Astoria, Oregon; Westport, Washington; or the fishing fleet in Seattle, Washington. The FR/EIS should have more discussion of the projected conditions under the status quo.

88 Section 9.2, Endangered and Threatened Species and Critical Habitat: There should be a reference to Section 7 (a)(1) of the Endangered Species Act, which requires Federal agencies to go beyond merely consulting with the Service and NMFS to ensure their proposed actions do not jeopardize listed species. Action agencies must also utilize their authorities to carry out programs to conserve endangered and threatened species, in consultation with the Service and NMFS.

89 Section 9.3.1, Fish and Wildlife Coordination Act: The citation listed for this Act should be changed to "Fish and Wildlife Coordination Act of March 10, 1934 (48 Stat. 401., as amended, 16 U.S.C. 661 et seq.)."

90 Page 12-10, line 34: Name correction. Change "Yosinaka" to "Yoshinaka."

Appendix A, Anadromous Fish:

91 Page A ES-1,3rd paragraph, 2nd bullet: This bullet should be expanded such that it is clear that PATH developed estimates of direct mortality for sources of mortality outside the migration corridor (e.g. ocean harvest) where data were available.

92 Page A ES-2, 4th paragraph, #3: This bullet should be explicit and clear that these sensitivity analyses are hypothetical, they have informally been referred to as "thought experiments" by participating scientists. The text should be revised to say "Perform sensitivity analysis to assess where the greatest opportunities for promoting recovery exist in the life cycles of threatened salmonids based on hypothetical numbers.

93 Page A ES-4, 2nd paragraph: The overall PATH results include uncertainty and conflicting hypotheses while identifying the option that has the greatest probability of survival and recovery and is the most risk-averse. The A-Fish, however, isolates certain individual models from PATH as an indication of drawdown failure. That approach is not risk-averse, and defeats the purpose of doing a rigorous decision analysis as was done in PATH. We recommend that the NMFS CRI analysis take a decision analysis approach which evaluates risk in a similar manner as PATH.

94 Page A ES-3, #6: The FR/EIS should clearly state that this step is not yet completed, and that therefore the CRI results are preliminary and highly uncertain.

95 Page A ES-6, #2: Here and elsewhere, the FR/EIS should note that this action(s) is adequate for minimizing short term extinction but is not necessarily adequate for eventual recovery (See above

95 cont. text in General Comments).

96 Page A ES-7, first bullet: This bullet should also note that the benefits of dam breaching depend on the degree that the hydrosystem affects post-Bonneville smolt mortality and whether transported fish survive equally as well in the ocean after release as in-river migrants.

97 Page A ES-8, top line: After "feasible," the text should also say "and likely of having the hypothesized benefit to survival." This bullet should note that dam breach alone may be sufficient if D is low and some or all of extra mortality is related to hydrosystem experience (See General comment section for more discussion).

98 Page A ES-8, #3: Here and elsewhere, it should be noted that this action(s) is adequate for minimizing short term extinction but is not necessarily adequate for eventual recovery.

99 Page A ES-8, #7: It should be noted here and elsewhere where future research is discussed that further research does not guarantee the elimination, or even a sufficient reduction, in uncertainty for these types of management decisions.

100 Page A2-4, end of 1st paragraph: We recommend that information on the SAR's (smolt-to-adult) survival rates of fish that experienced different routes throughout the hydrosystem (e.g. multiple bypass) be used to quantify delayed mortality and that the FR/EIS should discuss D and extra mortality thoroughly.

101 Page A2-4, 4th paragraph, 1st sentence: We recommend rewording this sentence to read: Recent (post-1990) smolt-to-adult rates (<0.05 percent) are too low to sustain vigorous populations during ordinary environmental fluctuations.

102, 103 Page A2-12, 1st paragraph: We recommend using a formal weight of evidence. NMFS may believe there may not be "compelling" data, but there certainly are data and various different types of information that should be considered (See General Comment section for more discussion).

104 Page A3-3, top line: The "new data [that] render some of the weighting obsolete" should be clearly identified here.

105 Page A3-3, 2nd paragraph, 2nd to last sentence: We recommend that this sentence be deleted. The PATH modeling approach was specifically developed to account for conflicting hypotheses where uncertainties remain, rather than as a consensus seeking forum. The strength of PATH is that the results reflect the fundamental scientific disagreements while still identifying the management action with the greatest probability of survival and recovery and the least amount of risk for the listed salmonids.

106 Page A3-8, 1st paragraph: The FR/EIS should note that PATH did not model extinction risk at NMFS direction.

107 | Page A3-8, 2nd paragraph: We recommend revising this paragraph given that PATH did consider habitat improvements and continued habitat degradation, reduced predation, and severe harvest restrictions. In addition, PATH attempted to consider the potential biological benefit of proposed management scenarios thoroughly and realistically, and evaluated the practical feasibility of these changes where possible.

108 | Appendix B, Resident Fish: Recommend use of 'non-native' rather than 'introduced' throughout the appendix.

109 | Page B ES-5, line 26: When referring to food habits in Lower Granite Reservoir, Naughton (1998) states, "Crustaceans and non-salmonid fishes were the most abundant food items by weight of both smallmouth bass and northern pikeminnow from April through August 1996 and 1997." We suggest replacing this bullet with "Resident non-salmonid fishes can contribute significantly to the food base of these fish predators."

110 | Page B ES-7, line 32: We recommend the addition of the word "partially" prior to "regulate flows," followed by the sentence, "Several significant tributaries to the Snake River will have no regulation, including the mainstem Clearwater, Salmon, Imnaha, Grand Ronde, Tucannon, and Palouse rivers."

111 | Page B ES-9, line 12: We recommend removing the statement that "future management options that may be developed to enhance juvenile salmonid survival would most likely be detrimental to the resident fish communities" as unsupported speculation.

112 | Page B ES-9, line 24: We recommend replacing the word "negative" with "cooling" because the effects of Dworshak releases are not all negative.

113 | Page B ES-10, line 1: We recommend the addition of the word "partially" prior to "regulate," followed by the sentence, "Several significant tributaries to the Snake River will have no regulation, including the mainstem Clearwater, Salmon, Imnaha, Grand Ronde, Tucannon, and Palouse rivers."

114 | Page B2-1, 2: Information Sources for Resident Fish--Appendix M covers much of the same information presented in this appendix from the perspective of the Fish and Wildlife Coordination Act and should be referenced here.

115 | Page B3-27, line 36: We recommend inserting the phrase "other than suckers," after the phrase, "The native fish."

116, 117 | Page B3-29, Section 3.4, Spawning Temperature Summary: Although it is an important point that cool water will affect productivity and growth of many resident species, we believe effects of Dworshak Dam water releases meant to cool water temperatures in the lower Snake River are being overemphasized. For example, 1994 is given as an example of a year where Dworshak

116, 117 cont. Dam releases delayed spawning activity substantially. Yet according to Figure 3-5, water temperatures are higher than other given years. Although the influence of Dworshak Dam releases is greater in low flow years, typically, water temperatures still remain higher than in high-flow years. Also, cold water releases from Dworshak Dam typically do not begin until after the 4th of July in order to keep Dworshak Reservoir full for as long as possible.

118 Page B3-29, line 36: Regarding the year 1994, the FR/EIS states that "Three episodes of rapidly declining water temperatures are evident in mid-May, mid-June, and nearly the entire month of July into August." However, in figure 3-5, for 1994, no data is shown for mid-May, and water temperatures are not shown to be "rapidly declining," but rather the rate of increase is rapidly declining. These discrepancies need to be addressed.

119 Page B4-17, line 36: We recommend deleting the phrase "would have the effect" and replace with "potentially could influence." On line 37, remove the phrase "of influencing."

120 Page B4-20, lines 10-13: We recommend removing this sentence since it is too speculative.

121 Page B4-20, line 26: We recommend removing the word "adversely."

122 Page B4-22, lines 22-24: Water temperature is not the limiting factor affecting native resident fish, so we suggest rewording the sentence.

123 Page B4-23, line 6: Recommend adding the word "partially" prior to the phrase "regulated flows."

124 Page B4-28, line 29: We recommend adding the following sentence after the last sentence, "However, releases from Dworshak Reservoir for temperature control in the Lower Snake River typically do not occur until after the 4th of July."

125 Page B4-28, lines 30-35: We recommend removing this paragraph because summer flow releases from Dworshak Reservoir are done to maintain non-lethal water temperatures for juvenile salmonids, and it is not likely flow releases would remain the same given a drawdown scenario.

126, 127 Page B4-30, lines 29-35: We believe this paragraph puts too much emphasis on impacts of releases of cool water from Dworshak Reservoir. The Technical Management Team has been able to minimize adverse impacts of cool water in the past and should be able to in the future.

Appendix D, Natural River Drawdown Engineering

128 Page D3-1, first bullet: The FR/EIS states that construction activities would be orchestrated, as far as possible, to help ensure ongoing fish passage is not adversely affected. We suggest accomplishing that by moving the actual drawdown window outside of the peak migration of adult fall chinook and steelhead. Sliding the work window into the December to February time frame would reduce impacts to these fish.

129 Page D4-2, Period of Drawdown: A general rationale is given for not drawing down the reservoirs during the time when fewest anadromous fish impacts would result. We request that the FR/EIS provide at least a summary of the risk assessment that went into that decision.

130 Page D7-1, line 25: Change "79 miles" to "97 miles."

131 Page D7-3, Section 7.6, Lyons Ferry Hatchery Modifications: This section states that the hatchery was constructed to mitigate for fish and wildlife habitat losses; however, the hatchery was constructed to mitigate only for fish losses. Please delete reference to wildlife habitat or describe the wildlife habitat mitigation that has taken place here.

132 Annex J: Habitat Management Units Modification Plan: This proposal evaluates modifying two existing wells and 11 surface-water pumping plants in the reservoirs to ensure current irrigation at the HMUs is maintained. However, there should also be a discussion of the feasibility of switching the surface-water pumping plants to groundwater wells.

Annex K: Reservoir Revegetation Plan

133 Page 1, Phase I, Initial Seeding, first paragraph: The seeding schedule seems to assume that drawdown would take place at all four reservoirs concurrently. However, the main report states that a two-year drawdown schedule (two reservoirs drawn down concurrently each year) has been assumed. Please rectify the two sections. We recommend that seeding take place more continuously throughout the drawdown rather than at two week intervals as proposed. This would allow seeding to take place immediately following exposure of substrate and should increase seeding success by taking advantage of moist conditions.

134 Page 1, line 33: It is stated that expectations are low, that seeding would result in more than sporadic vegetation. But on page 2, line 2, it is assumed that the seeding would be effective for 70 percent of the exposed lands. We agree that seeding success should be relatively effective for the majority of the area and suggest removing the sentence referring to low expectations.

135 Appendix I, Economics: Many of the assumptions, especially in the section dealing with potential recreational benefits associated with restoring natural river conditions on the Snake River, appear to be conservative. This has the effect of reducing the potential benefits. We recommend that the FR/EIS provide a more detailed explanation of the rationale for the conservative assumptions.

136 Page I3-159, line 15: This sentence indicates that O & M costs at the HMUs and parks would be continuing under the Natural River Drawdown Alternative. These costs would be ended when the current project lands are transferred by the Corps to others about 20 to 25 years following drawdown. This sentence and any corresponding calculations for avoided costs or other areas in the report related to O & M costs needs to take into account the Corps' intention to relinquish ownership of project lands relatively soon following drawdown.

137 Section 3.8 Implementation/Avoided Costs: Full mitigation has not been met for wildlife impacts

137 cont. due to the dams. The FR/EIS should clarify whether planned and other future wildlife mitigation measures (aside from O & M costs at HMUs as discussed above) were listed as avoided costs under the Natural River Drawdown Alternative. If the dams are breached, those mitigation measures should no longer be necessary and their projected cost should be considered an avoided cost. This is consistent with the discussion of future mitigation requirements as discussed in Appendix L, LSR Mitigation History and Status.

138 Page I5-13, Table 5-9: The heading entitled "Alternative 3" should be changed to "Alternative 4."

Appendix L, LSR Mitigation History and Status

139 Page L ES-1, line 27: Add the phrase "a portion," before "hatchery raceways."

140, 141 Page L ES-2, line 18: Technically, the FR/EIS is correct in stating that the Corps has met its "purchase and construction" requirements for the hatchery program. However, the Comp Plan goals are to return adults to the Snake River Basin to compensate for dam-caused losses, not just to construct facilities that attempt to do so. Therefore, the FR/EIS should state here that the Comp Plan's adult return goals are not being met. See similar comments for Section 2.2.1. (Note: Table 2-1 should include a column with the adult goals and could be referenced here.).

142, 143 Page L ES-2, Future Mitigation Requirements: The FR/EIS should state that the Comp Plan hatchery program will need to be re-evaluated under the non-breach and breach alternatives. As stated in Appendix M, compensation goals (particularly those for chinook) are not likely to be achievable with the non-dam breach alternatives. Therefore, the current Comp Plan assumptions and assessments will need to be revisited to determine how compensation could be achieved. With the dam breach option, the hatchery program would likely need to be altered to respond to different productivity conditions and, as Appendix M notes, the program might best be used to aid in restoration and recovery.

144 Page L ES-2, line 28: Following this sentence, a sentence or two needs to be added to indicate that previous HEP analyses have been largely based on extrapolation of detailed sampling done on only a few project areas. A modified HEP procedure, which used such tools as ocular estimates to cover large areas relatively quickly, was also completed on most of the mitigation lands (USFWS, 1995). However, a traditional and comprehensive HEP study should soon be initiated, which will result in a more detailed analysis of habitat quality on all of the mitigation lands.

145 Page L ES-2, line 35: This sentence states that little or no changes to the present mitigation program will occur under non-breaching alternatives. However, since established mitigation goals are currently unachievable, the current program needs to be reviewed and updated. The sentence needs to be changed to reflect the potential for future changes to the program.

146 Page L2-4, line 18: Add a sentence stating that the funding for the Operation and Maintenance of the facilities is administered and managed by the Service. A final sentence should be added which references Section 11.1.1.1 of Appendix M. This section explains the present status of hatchery

146 cont. compensation plan program and states that no adult chinook goals and only some steelhead goals are being met.

147 Page L2-4, line 21: This sentence should be revised to state that the health lab is no longer under construction; it is complete.

148 Page L2-5, Table 2-1: The table should be revised to include a column (after Fish Type) showing the Adult Goals as follows:

| | | |
|---|---|---|
| Lookingglass | Spring chinook | 9,072 |
| Irrigon | Steelhead | 11,184 |
| Lyons Ferry | Fall chinook | 18,300 |
| | Spring chinook | 1,152 |
| | Steelhead | 4,656 |
| Sawtooth | Spring chinook | 19,232 |
| Dworshak | Spring chinook | 9,000 |
| Clearwater | Steelhead | 14,000 |
| | Spring chinook | 12,200 |
| Magic Valley | Steelhead | 11,660 |
| Hagerman | Steelhead | 13,600 |
| McCall | Summer chinook | 8,000 |

149, 150 Page L3-1, lines 8-10: Appendix M (page M11-1), summarizes the results of a recent symposium which reviewed the status of the Comp Plan hatchery program. The presenters' and reviewers' conclusions were based on estimates of adults returns compiled over several years from various release programs. Based on the conclusions found in Appendix M, we recommend revising this sentence to the effect that the program was not meeting chinook goals and only some of the steelhead goals.

151 Page L3-3, line 13,14: We recommend that the FR/EIS describe the significance of CAD data not being feature coded, as stated, or else delete the sentence.

152, 153 Page L4-1, lines 12,13: Funding of Dworshak National Fish Hatchery (NFH) is to provide mitigation for Dworshak Dam and has nothing to do with mitigation for lower Snake River dams. We recommend either deleting the reference to the Dworshak NFH or clarifying it.

154, 155 Page L4-2, line 18: The FR/EIS states that mitigation lands need to be maintained at current levels; however, this infers that habitat conditions are currently optimum. The sentence should indicate that current mitigation is not satisfactory and be followed by, "Much of the habitat must still mature for many decades, much has not reached pre-project vegetation diversity levels, and there is a significant amount of non-native vegetation incorporated into the habitat which needs to be phased out."

156, 157, 158 Sections 4.2.1 and 4.3.1: The FR/EIS should state that the Comp Plan hatchery program will

156, 157, 158 cont. need to be re-evaluated regardless of the alternative selected. As stated in Appendix M, compensation goals (particularly those for chinook) are not likely to be achievable with the non-dam breach alternatives. Therefore, the current Comp Plan assumptions and assessments will need to be revisited to determine how compensation could be achieved. With the dam breach option, the hatchery program would likely need to be altered to respond to different productivity conditions and, as noted in Appendix M, the program might best be used to aid in restoration and recovery.

Appendix M, Fish and Wildlife Coordination Act Report

159 Page M9-6: Shading needs to be changed to improve clarity of the figure.

160 Page M12-3, line 10: Delete the word "healthy."

161 Page M14-1, line 20: Add the word "potential" before the phrase "increased straying."

Literature Cited: We recommend adding the following references:

National Marine Fisheries Service. 1999. "No Need to Expand Endangered Species Act Coverage to Oregon and Northern California Chinook, Fishery Agency Says." September 9, 1999 Press Release. NOAA 99-R151.

Nez Perce Tribe of Idaho and IDFG. 1990. Clearwater River Subbasin. Salmon and Steelhead Production Plan. September 1, 1990. Lapwai, Idaho. 238 pp.

162 Petersen. J.H., C. Barfoot, S. Sauter, D. Gadomski, P. Connolly, and T.P. Poe. 1999. Predicting the Effects of Dam Breaching in the Lower Snake River on Predators of Juvenile Salmonids. DRAFT. USGS, Western Fishery Research Center, Columbia River Research Laboratory, Cook, Washington.

Seeyle, J.G. and M.J. Mac. 1984. Bioaccumulation of Toxic Substances Associate with Dredging and Dredged Material Disposal. A Literature Review for the U.S. Environmental Protection Agency. EPA-905/3-84-005.

U.S. Army, Corps of Engineers. 1999. Lower Snake River Juvenile Salmon Migration Feasibility Study. Advanced Review Version. Preliminary Draft Feasibility Report/Environmental Impact Statement. July 1999. U.S. Army, Corps of Engineers, Walla Walla, WA

Thank you for the opportunity to comment. For further information, please contact Mr. William Shake, U.S. Fish and Wildlife Service, at 503-872-2761.

Sincerely,

Preston Sleeger
Regional Environmental Officer